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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/735,675

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Stephan J. Jourdan

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EXAMINER

TREAT, WILLIAM M

ART UNIT

PAPER NUMBER

2181

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DELIVERY MODE

05/29/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/735,675	Applicant(s) JOURDAN ET AL.	
	Examiner William M. Treat	Art Unit 2181	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 March 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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1. Claims 1-29 are presented for examination.

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-29 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

4. Applicants have amended independent claims 1, 15, 18, and 26 to recite:

“wherein the checking predictions include predictions selected from a group comprising global, bimodal, return stack buffer and indirect predictions.” There is no support for such a limitation in applicants’ original disclosure, and for this reason the examiner considers the amendments to the claims to represent new matter which must be removed from the claims. Applicants’ original disclosure does say on page 7, paragraph 25: “FIGS. 7 and 8 show a **next-line predictor** 72 that has a bimodal component 74, a global component 76, a return stack buffer (RSB) component 78 and an indirect branch component 80. The bimodal component 74 generates bimodal predictions 75 based on previous next-line predictions and the global component 76 generates global predictions 77 based on the previous next-line

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predictions. The global component 76 also generates indirect predictions 80 based on indirect branch values. The RSB component 78 generates return predictions 79 based on a return stack buffer value. The **next-line predictor 72** selects from the bimodal predictions, the global predictions, the return predictions and the indirect predictions to obtain current next-line predictions. Thus, the set of predictions 73 generated by the **next-line predictor 72** closely approximate the predictions of a more complex checking predictor.” This is a statement of what the next-line predictor does and does not say that the checking predictor uses the same components as the next-line predictor.

5. Claims 1-29 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

6. Claims 1-29 make reference to checking predictions generated by a checking predictor (element 86 in applicants' Fig. 2). On pages 4 and 5, paragraph 18, applicants state: “In the illustrated example, the next-line predictions 22, 24 have a latency of approximately one clock cycle, where the checking predictions 26, 28 have a latency of approximately three clock cycles. The longer latency of the checking predictions 26, 28 is due to the more complex prediction algorithms associated with the checking predictions 26, 28.” On page 7, paragraph 25, applicants state: “FIGS. 7 and 8 show a next-line predictor 72 that has a bimodal component 74, a global component 76, a return stack buffer (RSB) component 78

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and an indirect branch component 80. The bimodal component 74 generates bimodal predictions 75 based on previous next-line predictions and the global component 76 generates global predictions 77 based on the previous next-line predictions. The global component 76 also generates indirect predictions 80 based on indirect branch values. The RSB component 78 generates return predictions 79 based on a return stack buffer value. The next-line predictor 72 selects from the bimodal predictions, the global predictions, the return predictions and the indirect predictions to obtain current next-line predictions. Thus, the set of predictions 73 generated by the next-line predictor 72 closely approximate the predictions of a more complex checking predictor. The examiner considers the checking predictor and how it functions to be essential to the enablement of applicants' claims and invention; yet, the description of the checking predictor is so limited as to preclude one of ordinary skill from constructing **applicants' checking predictor** and, as a result, practicing applicants' invention.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

9. Each of applicants' claims make reference to generating checking predictions and claims 18-29 explicitly claim a checking predictor but applicants' description of **applicants' checking predictor** and how it functions to generate a checking prediction is so limited as to preclude the examiner from determining the true metes

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and bounds of applicants' claims. Surely, applicants cannot claim to have conceived of/invented all forms of checking predictor which are more complex than their next line predictor; therefore, the examiner cannot determine, with any clarity, the limits to applicants' claimed invention. See paragraphs 4 and 6, *supra*, for a further explanation of related issues.

10. (a) Applicants have argued in response to the examiner's new matter rejection that the specification clearly states that the predictions generated by the next-line predictor "closely approximate the predictions of a more complex checking predictor" (par. 0027). Thus, one skilled in the art would conclude that the inventors, at the time the application was filed, considered the claimed checking predictions to have a content that is similar to that of the above- described next-line predictions.

(b) Applicants have argued in response to the examiner's lack of enablement rejection that checking predictors and predictions were well known in the art in December of 2003. For example, Applicants have already directed the Examiner's attention to U.S. Patent No. 5,283,873 to Steely, Jr. et al. ("Steely"), which is representative of the state of the art at least as early as 1994 and provides a detailed explanation of one approach to a conventional prediction check stage. Against this backdrop, the specification of the present application teaches that the checking predictors 86 shown in FIG. 2 of the present application can be implemented in a branch prediction architecture 84 of a processor 82, as shown in FIG. 9 of the present application. Moreover, the specification of the present application provides additional design constraints, such as the general components of the checking predictions (e.g., global, bimodal, etc., discussed above), the

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prediction latency of the checking predictors (e.g., three clock cycles; par. 0020), and the fact that the checking predictions may be independent from one another (e.g., par. 0020). In view of the above teachings, Applicants assert that one skilled in the art would have readily been able to implement the claimed invention. (c)

Applicants have argued in response to the examiner's 35 USC 112, 2nd paragraph rejection that applicants assert that the limits of the claims can be found in the claims themselves. Indeed, it is clear that the claims in fact recite many more limitations than merely the checking predictions. For example, claim 1 calls for a current next-line prediction and a previous next line prediction, as well as a unique interrelationship between these predictions and the claimed checking predictions. For at least the above reasons, claims 1-29 are not indefinite. Accordingly, Applicants request that the Examiner withdraw the instant rejection.

11. As to 10(a), the examiner has pointed out that there is nothing in applicants' original disclosure saying such components are part of their checking predictor. In response applicants argue checking predictors are merely prior art devices and that the only way one of ordinary skill in the art could make a checking predictor that is slower than the next-line predictor, has more complex algorithms, and approximates the same predictions as the next-line predictor is, apparently, to use the same components as the next-line predictor. First, while applicants have presented one example of a prior art checking predictor, they have presented no evidence that one of ordinary skill would consider himself/herself bound by that one example when creating a checking predictor. Second, as pointed out by the examiner, applicants present an exemplary embodiment of their next-line predictor where " FIGS. 7 and 8

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show a next-line predictor 72 that has a bimodal component 74, a global component 76, a return stack buffer (RSB) component 78 and an indirect branch component 80.” If one uses the same components/algorithms as recited in applicants’ new claims, this does not explain what constitutes the more complex algorithms being used, nor does it explain why the same components now take longer and only approximate the results of the next-line predictor. There are a lot of holes in applicants assertion that one of ordinary skill would be inevitably led to the conclusion that the new matter of applicants’ independent claims would have been inherent in any checking predictor one of ordinary skill might design. They have presented no compelling evidence or logical arguments about the inevitability of their assertion.

12. As to 10(b), if one removes the new matter from applicants’ claims, applicants’ claims are for a checking predictor which is merely described as having more complex algorithms than a next-line predictor (without saying what those more complex algorithms are), as being slower than a next-line predictor, and as approximating the results of the next-line predictor. Unless one accepts applicants’ assertion as to how one of ordinary skill must inevitably design a checking predictor (absent any evidence or convincing logical argument), one is left with the conclusion applicants have failed to provide a description of even one embodiment of **applicants’ checking predictor** and have left those of ordinary skill to divine what applicant actually invented.

13. As to 10(c), absent the new matter, applicants’ claims are for all checking predictors which have more complex algorithms than applicants’ next-line predictor

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(without any description of these more complex algorithms), are slower, and produce approximately the same results (without giving any range as to how often the results will be the same or different). The examiner has no description of “more complex algorithms” against which he might evaluate art nor would another inventor be able to gauge whether his complex algorithm is that which is intended by applicants.

Whether a checking predictor which agrees with a next-line predictor 90% of the time is approximately the same or it must agree 95% of the time to be approximately the same is never clear to the examiner nor would it be to another inventor.

Applicants’ original claims in conjunction with their original disclosure fail to make clear the true metes and bounds of their claims in relation to the checking predictor.

As noted above, the examiner and those of ordinary skill are being required to divine what applicant actually invented.

14. Applicants could file claims such as described by 37 CFR 1.75(e) in a continuation which contain a preamble stating their McFarling-style next-line predictor (a prior art device using prior art components) is nothing more than a prior art device; their checking predictor is nothing more than a prior art device; the comparison of the two predictions is prior art; and the revision of the next-line predictor’s results, tables, etc. is also just prior art, but that would seem to leave little for the applicants to claim after the phrase, “wherein the improvement comprises”. Short of claims stating the bulk of their invention is actually just prior art, the examiner sees no resolution to applicants’ 35 USC 112 problems.

15. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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16. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

17. Any inquiry concerning this communication should be directed to William M. Treat at telephone number (571) 272-4175.

18. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/William M. Treat/

Primary Examiner, Art Unit 2181